

WHAT IS CLAIMED IS:

1. A damper component for absorbing and dissipating vibration and/or noise resonance, the damper component comprising:
 - a damper layer comprising a viscoelastomer; and
 - a continuous constraining layer intimately contacting and encasing the damper layer, the constraining layer having a greater stiffness and higher modulus of dynamic shearing elasticity than the damper layer, the constraining layer comprising a molded polyester sheet molding compound that is substantially immiscible with the viscoelastomer to provide a discrete interface between the constraining layer and the damper layer.
2. A damper component according to claim 1, wherein the viscoelastomer comprises a polymeric reaction product of a composition comprising a member selected from the group consisting of (meth)acrylic acid and (meth)acrylate.
3. A damper component according to claim 1, wherein the viscoelastomer comprises a polyacrylate.
4. A damper component according to claim 1, wherein the viscoelastomer comprises a member selected from the group consisting of nitrile rubbers and fluoroelastomers.
5. A damper component according to claim 1, wherein the damper layer is free of fillers.

6. A damper component according to claim 1, wherein the continuous constraining layer further comprises high density filler comprising a member selected from the group consisting of glass, carbon, aramids, metal, plastics, alumina, silica, silicon, ceramic, and graphite.

7. A damper component according to claim 1, wherein the continuous constraining layer further comprises chopped fiberglass.

8. A damper component according to claim 1, wherein the modulus of dynamic shearing elasticity of the continuous constraining layer is at least two orders of magnitude greater than that of the viscoelastic layer.

9. A damper component according to claim 1, wherein the modulus of dynamic shearing elasticity of the continuous constraining layer is at least three orders of magnitude greater than that of the viscoelastic layer.

10. A damper component according to claim 1, wherein the modulus of dynamic shearing elasticity of the continuous constraining layer is at least about 500,000 psi.

11. A damper component for absorbing and dissipating vibration and/or noise resonating from a device, the damper component comprising:

a fragmented damper layer comprising a plurality of fragments that are noncontinuous with each other to provide interstices between the noncontinuous fragments, the fragmented damper layer comprising a viscoelastomer; and

a continuous constraining layer intimately contacting and encasing the fragmented damper layer and filling the interstices between the noncontinuous fragments, the constraining layer having a greater stiffness and higher modulus of dynamic shearing elasticity than the fragmented damper layer, the constraining layer comprising a molded polyester sheet molding compound that is substantially immiscible with the viscoelastomer to provide discrete interfaces between the constraining layer and the noncontinuous fragments.

12. A damper component according to claim 11, wherein the viscoelastomer comprises a polymeric reaction product of a member selected from the group consisting of (meth)acrylic acid and (meth)acrylate.

13. A damper component according to claim 11, wherein the viscoelastomer comprises a polyacrylate.

14. A damper component according to claim 11, wherein the viscoelastomer comprises a member selected from the group consisting of nitrile rubbers and fluoroelastomers.

15. A damper component according to claim 11, wherein the fragmented damper layer is free of fillers.

16. A damper component according to claim 11, wherein the continuous constraining layer further comprises high density filler comprising a member selected from the group consisting of glass, carbon, aramids, metal, plastics, alumina, silica, silicon, ceramic, and graphite.

17. A damper component according to claim 11, wherein the continuous constraining layer further comprises chopped fiberglass.

18. A damper component according to claim 11, wherein the modulus of dynamic shearing elasticity of the continuous constraining layer is at least two orders of magnitude greater than that of the viscoelastic layer.

19. A damper component according to claim 11, wherein the modulus of dynamic shearing elasticity of the continuous constraining layer is at least two orders of magnitude greater than that of the viscoelastic layer.

20. A damper component according to claim 11, wherein the modulus of dynamic shearing elasticity of the continuous constraining layer is at least about 500,000 psi.

21. A method for making a damper component for absorbing and dissipating vibration and/or noise resonance, said method comprising:

providing a damper layer comprising a viscoelastomer;
arranging a melt-flowable, curable sheet molding compound adjacent the damper layer to form a laminate;

placing the damper layer and the melt-flowable, curable sheet molding compound in a mold cavity of a mold; and

heating the laminate under pressure in the mold to further cure the sheet molding compound to form a continuous constraining layer that intimately contacts and encases the damper layer, the constraining layer having a greater stiffness and higher modulus of dynamic shearing elasticity

than the damper layer, the constraining layer comprising a cured polyester sheet molding compound that is substantially immiscible with the viscoelastomer to provide a discrete interface between the continuous constraining layer and the damper layer.

22. A method according to claim 21, wherein the viscoelastomer comprises a polymeric reaction product of a composition comprising a member selected from the group consisting of (meth)acrylic acid and (meth)acrylate.

23. A method according to claim 21, wherein the viscoelastomer comprises a polyacrylate.

24. A method according to claim 21, wherein the viscoelastomer comprises a member selected from the group consisting of nitrile rubbers and fluoroelastomers.

25. A method according to claim 21, wherein the damper layer is free of fillers.

26. A method according to claim 21, wherein the melt-flowable, curable sheet molding compound comprises a B-stage polyester.

27. A method according to claim 26, wherein the B-stage polyester comprises first and second sheets placed on opposite sides of the damper layer.

28. A method according to claim 27, wherein the first and second partially cured, sheet molding compound sheets comprise substantially identical compositions.

29. A method according to claim 27, wherein the first and second partially cured, sheet molding compound sheets comprise different compositions from one another.

30. A method according to claim 27, wherein said arranging comprising rolling the melt-flowable, curable sheet molding compound and the damper layer into a jelly roll, and wherein said placing comprises placing the jelly roll into the mold cavity.

31. A method according to claim 21, wherein the modulus of dynamic shearing elasticity of the continuous constraining layer is at least about 500,000 psi.

32. A method according to claim 21, wherein the continuous constraining layer further comprises high density filler comprising a member selected from the group consisting of glass, carbon, aramids, metal, plastics, alumina, silica, silicon, ceramic, and graphite.

33. A method according to claim 21, wherein the continuous constraining layer further comprises chopped fiberglass.

34. A hard disc drive assembly comprising:
a head disc assembly comprising a disc having a surface and a track
for storage of information, a head for writing and reading information to and

from the disc, and an actuator arm for moving the head relative to the surface of the disc; and

a housing comprising a base and a cover cooperating with one another to form a chamber therebetween in which at least a portion of the head disc assembly is housed, at least one of the base and the cover comprising a damper component for damping noise and/or vibration resonated by the head disc assembly, the damper component comprising

a viscoelastic damper layer; and
a continuous constraining layer intimately contacting and encasing the viscoelastic damper layer, the constraining layer having a greater stiffness and higher modulus of dynamic shearing elasticity than the viscoelastic damper layer, the constraining layer being molded from a high density filler and a melt-flowable polymer matrix that is immiscible with and not chemically bonded to the viscoelastic damper layer.

35. A method for retrofitting a device or structure that resonates vibration and/or noise, said method comprising:

removing an existing structural component of the device or structure through which the vibration and/or noise resonates; and
replacing the existing structural component with a damper component according to claim 1.

36. A method for retrofitting a device or structure that resonates vibration and/or noise, said method comprising:

removing an existing structural component of the device or structure through which the vibration and/or noise resonates; and
replacing the existing structural component with a damper component according to claim 11.